AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1-27. (Canceled)

28. (New) A power factor correction circuit for correcting an input power factor by allowing a rectified voltage, obtained by rectifying an alternating current power-supply voltage of an alternating current power-supply with a rectifying circuit, to be inputted to a main switch via a booster reactor and allowing the main switch to be turned on or turned off while converting the power-supply voltage into a direct current output voltage, comprising:

a first series circuit connected between one output terminal and the other output terminal of the rectifying circuit and including a booster winding and a wind-up winding, both wound on the booster reactor, a zero-current switching reactor, a first diode and a smoothing capacitor;

a second series circuit connected between one output terminal and the other output terminal of the rectifying circuit and including the booster winding of the booster reactor, and the main switch;

a second diode connected between a junction, between the booster winding and the wind-up winding of the booster reactor, and the main switch and the smoothing capacitor;

control means for controllably turning on and off the main switch to control an output voltage of the smoothing capacitor to a given voltage;

a third series circuit including a first capacitor, and a third diode connected between a junction, between the zero-current switching reactor and the first diode, and the smoothing capacitor; and

a fourth diode connected between a junction, between the first capacitor and the third diode, and the smoothing capacitor.

29. (New) A power factor correction circuit for correcting an input power factor by allowing a rectified voltage, obtained by rectifying an alternating current power-supply voltage of an alternating current power-supply with a rectifying circuit, to be inputted to a main switch via a booster reactor and allowing the main switch to be turned on or turned off while converting the power-supply voltage into a direct current output voltage, comprising:

a first series circuit connected between one output terminal and the other output terminal of the rectifying circuit and including a booster winding and a wind-up winding, both wound on the booster reactor, a zero-current switching reactor, a first diode and a smoothing capacitor;

a second series circuit connected between one output terminal and the other output terminal of the rectifying circuit and including the booster winding of the booster reactor, and the main switch;

a second diode connected between a junction, between the booster winding and the wind-up winding of the booster reactor, and the main switch and the smoothing capacitor;

control means for controllably turning on and off the main switch to control an output voltage of the smoothing capacitor to a given voltage;

a third series circuit connected to the main switch in parallel and including a third diode and a snubber capacitor;

a fourth series circuit connected between a junction, between the third diode and the snubber capacitor, and one terminal of the first diode and including a fourth diode, a regenerative winding wound on the booster reactor, a current limiting reactor and a regenerative capacitor; and

a fifth diode connected between a junction, between the regenerative capacitor and the current limiting reactor, and a junction between the other terminal of the first diode and the smoothing capacitor,

wherein the zero-current switching reactor and the current limiting reactor include a leakage inductor between windings of the booster reactor, and

wherein the booster reactor includes the wind-up winding and the regenerative winding that are wound on a core in a nondense-coupled condition with respect to the booster winding.

30. (New) A power factor correction circuit for correcting an input power factor by allowing a rectified voltage, obtained by rectifying an alternating current power-supply voltage of an alternating current power-supply with a rectifying circuit, to be inputted to a main switch via a booster reactor and allowing the main switch to be turned on or turned off while converting the power-supply voltage into a direct current output voltage, comprising:

a first series circuit connected between one output terminal and the other output terminal of the rectifying circuit and including a booster winding and a wind-up winding, both wound on the booster reactor, a zero-current switching reactor, a first diode and a smoothing capacitor;

a second series circuit connected between one output terminal and the other output terminal of the rectifying circuit and including the booster winding of the booster reactor, and the main switch;

a second diode connected between a junction, between the booster winding and the wind-up winding of the booster reactor, and the main switch and the smoothing capacitor;

control means for controllably turning on and off the main switch to control an output voltage of the smoothing capacitor to a given voltage;

a third series circuit connected to the main switch in parallel and including a third diode and a snubber capacitor;

a fourth series circuit connected between a junction, between the third diode and the snubber capacitor, and one terminal of the first diode and including a fourth diode, a regenerative winding wound on the booster reactor, a current limiting reactor and a regenerative capacitor; and

a fifth diode connected between a junction, between the regenerative capacitor and the current limiting reactor, and a junction between the other terminal of the first diode and the smoothing capacitor,

wherein the booster reactor includes a core having first to third legs, in which a magnetic circuit is formed, and wherein the first leg is wound with the booster winding, the second leg is wound with the wind-up winding and the third leg is wound with the regenerative winding.

31. (New) A power factor correction circuit for correcting an input power factor by allowing a rectified voltage, obtained by rectifying an alternating current power-supply voltage of an alternating current power-supply with a rectifying circuit, to be inputted to a main switch via a booster reactor and allowing the main switch to be turned on or turned off while converting the power-supply voltage into a direct current output voltage, comprising:

a first series circuit connected between one output terminal and the other output terminal of the rectifying circuit and including a booster winding and a wind-up winding, both wound on the booster reactor, a zero-current switching reactor, a first diode and a smoothing capacitor;

a second series circuit connected between one output terminal and the other output terminal of the rectifying circuit and including the booster winding of the booster reactor, and the main switch;

a second diode connected between a junction, between the booster winding and the wind-up winding of the booster reactor, and the main switch and the smoothing capacitor;

control means for controllably turning on and off the main switch to control an output voltage of the smoothing capacitor to a given voltage, and for controlling a switching frequency of the main switch in dependence on a value of an alternating current power-supply voltage of the alternating current power-supply,

wherein the control means includes:

first error voltage generating means for amplifying an error between the output voltage and a reference voltage to generate a first error voltage signal;

multiplied output voltage generation means for multiplying the first error voltage signal of the first error voltage generating means and the rectified voltage of the rectifying circuit to generate a multiplied output voltage;

current detection means for detecting an input current flowing through the rectifying circuit;

second error voltage generation means for amplifying an error between a voltage depending on the input current, detected by the current detection means, and the multiplied output voltage of the multiplied output voltage generation means;

frequency control means for generating a frequency control signal, by which a switching frequency of the main switch is varied, depending on a value of the alternating current power-supply voltage of the alternating current power-supply; and

pulse width control means for controlling a pulse width depending on the second error voltage signal of the second error voltage generation means and generating a pulse signal, by which the switching frequency of the main switch is varied, in dependence on the frequency control signal generated by the frequency control means, to allow the pulse signal to be applied to the main switch for controlling the output voltage to the given voltage.

32. (New) A power factor correction circuit for correcting an input power factor by allowing a rectified voltage, obtained by rectifying an alternating current power-supply voltage of an alternating current power-supply with a rectifying circuit, to be inputted to a main switch via a booster reactor and allowing the main switch to be turned on or turned off while converting the power-supply voltage into a direct current output voltage, comprising:

a first series circuit connected between one output terminal and the other output terminal of the rectifying circuit and including a booster winding and a wind-up winding, both wound on the booster reactor, a zero-current switching reactor, a first diode and a smoothing capacitor;

a second series circuit connected between one output terminal and the other output terminal of the rectifying circuit and including the booster winding of the booster reactor, and the main switch;

a second diode connected between a junction, between the booster winding and the wind-up winding of the booster reactor, and the main switch and the smoothing capacitor; and

control means for controllably turning on and off the main switch to control an output voltage of the smoothing capacitor to a given voltage, and for controlling a switching frequency of the main switch in dependence on a value of an alternating current power-supply voltage of the alternating current power-supply,

wherein the control means is operative to set to switching frequency to a lower limit frequency when the alternating current power-supply voltage is less than a lower limit preset voltage and set the switching frequency to an upper limit frequency when the alternating current power-supply voltage exceeds an upper limit preset voltage while varying the switching frequency from the lower limit frequency to the upper limit frequency under circumstances where the alternating current power-supply voltage remains in a range between the lower limit preset voltage and the upper limit preset voltage.

33. (New) The power factor correction circuit according to claim 32, wherein the control means is operative to interrupt switching operations of the main switch under circumstances where the alternating current power-supply voltage is less than the lower limit preset voltage.

34. (New) A power factor correction circuit for correcting an input power factor by allowing a rectified voltage, obtained by rectifying an alternating current power-supply voltage of an alternating current power-supply with a rectifying circuit, to be inputted to a main switch via a booster reactor and allowing the main switch to be turned on or turned off while converting the power-supply voltage into a direct current output voltage, comprising:

a first series circuit connected between one output terminal and the other output terminal of the rectifying circuit and including a booster winding and a wind-up winding, both wound on the booster reactor, a zero-current switching reactor, a first diode and a smoothing capacitor;

a second series circuit connected between one output terminal and the other output terminal of the rectifying circuit and including the booster winding of the booster reactor, and the main switch;

a second diode connected between a junction, between the booster winding and the wind-up winding of the booster reactor, and the main switch and the smoothing capacitor;

a rush current limiting resistor connected between the rectifying circuit and the smoothing capacitor and decreasing a rush current of the smoothing capacitor when the alternating current power-supply is turned on;

a semiconductor switch connected to the rush current limiting resistor in parallel; and

control means for controllably turning on and off the main switch to control an output voltage of the smoothing capacitor to a given voltage,

wherein the main switch includes a normally turned on type switch, and

wherein the control means is operative to:

turn the main switch off in response to a voltage developed across the rush current limiting resistor when the alternating current power-supply is turned on;

begin switching operations to turn on and off the main switch after the smoothing capacitor is charged; and

turn on the semiconductor switch after the switching operations of the main switch are commenced.